electric machines, and on electric lights, by M. Potier.—On electric shadows and on various connected phenomena, by M. Righi.—On the surface of the wave, by M. Doyen.—Demonstration of the principle of Archimedes for bodies immersed in various gases, by M. Terquem.

Atti della R. Accademia dei Lincei. Transunti, Vol. xvii., fasc. 1.—On attenuation of the carbuncular virus, by S. Perroncito.—On the tenacity of the carbuncular virus in its forms of spores, or of *Bacillus anthracis*, by the same —On the presence of yttrium in the sphene of syenite of Biellese, by S. Cossa.—New Sicilian fungi, by Srs. Passerini and Beltiami.—On some unpublished propositions of Fermat, by M. Henry.—On the action of chloride of cyanogen on the potassic compound of pyrrol, by Srs. Ciamician, and Dennstedt.

Vol. xvii. Fasc. 2.—On a class of triple systems of orthogonal surface, by S. Bianchi.—Observations of the Venus transit at the Observatory of Campidoglio, by S. Respighi.—Reports on prize competitions.

Reale Istituto Lombardo di Scienze e Lettere. Rendiconti. Vol. xv. Fasc. xvii.—On compensatory hypertrophy of the kidneys, by S. Golgi.—On drunkenness in Milan (continued), by S. Verga.

Fasc. xix.—Prof. Giacci's "Fundamental theorem in the theory of the canonical equations of motion," by S. Morera.—On drunkenness in Milan (continued), by S. Verga.—On olivil and some of its transformations, by Srs. Körner and Carnelutti.—Congenital pachydactylia from a psychical impression in the mother, by S. Scarenzio.—Observation of the transit of Venus at the Royal Observatory of Brera, on December 6, 1881, by S. Schiaparelli.—Bacteria of anthrax in the fœtus of a heifer that died of the disease, by S. Sangalli. Discussion with S. Golgi.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, February 1.—"On the Affinities of Thylacoleo," by Prof. Owen, C.B., F.R.S., &c.—Since the appearance of Part IV. of the "Fossil Mammals of Australia" in the *Philosophical Transactions* for 1871, the author has omitted no opportunity of promoting the acquisition of additional evidences. The application of a grant by the Legislature of New South Wales, in aid of further exploration of the Limestone Caverns in Wellington Valley, having been confided to Ed. P. Ramsay, F.L.S., the results have furnished the author with additional evidences, including those which form the subject of the present communication. After a brief exposition of the state of the question at the date of the previous paper, a description is given of the complete dentition of the upper and lower jaws of a mature marsupial lion. This is followed by descriptions of the antibrachial bones and ungual phalanges of the same extinct animal, the characters of those parts of the skeleton being compared with the same parts in feline mammals and in the existing kinds of diprotodont marsupials. The paper concludes with a description of an entire mandible; and the conclusions to be drawn from the shape and position of the articular condyles, which harmonise with those deducible from fragmentary fossils previously described, go nearly to complete the reconstruction of what the author deems to be the most extraordinary of the extinct pouched quadrupeds of Australia.

The paper was accompanied by drawings of the natural size of the fossils described.

In the subsequent discussion the author remarked on the correspondence of spælean phenomena, the proportion of the remains of the old British lion in bone caves of this country being paralleled by that of the Australian carnivore in the antipodean caves. They were the retreat of the destroyer in both localities; and the fragmentary, gnawed condition of the remains of the prey, with usual immaturity of the captured kangaroos of great size, the *Diprotodon australis*, *e.g.*, afforded an instructive analogy.

"Preliminary Note on a Theory of Magnetism based upon New Experimental Researches." By Prof. D. E. Hughes, F.R.S.

In the year 1879 (*Proc. Roy. Soc.*, vol. xxix. p. 56, 1879) I communicated to the Royal Society a paper "On an Induction Currents Balance and Experimental Researches made therewith." I continued my researches into the molecular construction of metallic bodies, and communicated the results then obtained in three separate papers (*Proc. Roy. Soc.*, vol. xxxi. p. 525; vol. xxxii. pp. 25, 213, 1881) bearing upon molecular magnetism.

To investigate the molecular construction of magnets, required again special forms of apparatus, and I have since been engaged upon these, and the researches which they have enabled me to follow.

From numerous researches I have gradually formed a theory of magnetism entirely based upon experimental results, and these have led me to the following conclusions:—

1. That each molecule of a piece of iron, steel, or other magnetic metal is a separate and independent magnet, having its two poles and distribution of magnetic polarity exactly the same as its total evident magnetism when noticed upon a steel bar-magnet.

2. That each molecule, or its polarity, can be rotated in either direction upon its axis by torsion, stress, or by physical forces, such as magnetism and electricity.

3. That the inherent polarity or magnetism of each molecule is a constant quantity like gravity; that it can neither be augmented nor destroyed.

4. That when we have external neutrality, or no apparent magnetism, the molecules, or their polarities, arrange themselves so as to satisfy their mutual attraction by the shortest path, and thus form a complete closed circuit of attraction.

5. That when magnetism becomes evident, the molecules or their polarities have all rotated symmetrically in a given direction, producing a north pole if rotated in this direction as regards the piece of steel, or a south pole if rotated in the opposite direction. Also, that in evident magnetism, we have still a symmetrical arrangement, but one whose circles of attraction are not completed except through an external armature joining both poles.

The experimental evidences of the above theory are extremely numerous, and appear so conclusive, that I have ventured upon formulating the results in the above theory.

I hope in a few weeks to bring before the Royal Society the experimental evidence which has led me to the conclusions I have named; conclusions which have not been arrived at hastily, but from a long series of research upon the molecular construction of magnetism now extending over several years.

Linnean Society, January 18.—Sir John Lubbock, Bart., F.R.S., president, in the chair.—E. A. L. Batters, A. J Burrows, E. F. Cooper, Prof. J. A. Harker, and G. Lewis, were elected Fellows of the Society.—Mr. H. Grooves called attention to a specimen of *Ranunculus ophioglossifolius* obtained in Hampshire, and therefore new to Britain.—There was exhibited, on behalf of Mr. Jas. Romanis, a live specimen of *Pieris Rapæ*, which had been found fluttering on the window of his house a few days previously.—A paper was read on the fall of branchlets in the aspen (*Populus tremula*) by Samuel G. Shattock. He shows that in this tree and some few others—in contradiction to the majority of exogenous trees—a process takes place termed "cladoptopsis" by the Rev. M. J. Berkeley many years ago. In the small branchlets only disarticulation is effected by a swollen ring of corky tissue at the base, somewhat as in the ordinary fall of leaves.—Mr. A. G. Bourne gave a contribution on the anatomy of Polynoina, pointing out that the *Polynoë grubiana*, very common in the Mediterranean, is only a variety of the *P. clava*, Montague, of our own coasts. The latter itself has certain constant characteristics, and others much more variable.—Prof. P. Martin Duncan read his observations on the Madreporaria, fam. Fungidæ, with special reference to the hard structures. Edwards and Haime described the synapticula as constituting an essential family structure, and also the absence of endothecal dissepiments. Dr. Duncan describes that the ridges of the continuous synapticula with canals between them is limited by solid and also perforate septa, and he delineates the structures. The synapticula are shown to have no relation to the ornamentation on the ridges of the septa. The basal wall is shown to be of synapticular origin, and the foramina in it to relate to the growth of these binding structures.

Physical Society, January 27.—Prof. Clifton, president, in the chair.—New Member, Mr. Hugh E. Harrison.—Prof. G. Carey Foster read a paper on the determination of the ohm, in which he described the various methods which have been used and proposed in determining the B.A. unit of resistance. He also described a method of his own, proposed in 1874, and recently tried with good results. The method consists in balancing the E.M.F. set up in a coil of wire by spinning it in the earth's magnetic field, against the E.M.F. of a battery or

other electromotor, in a wire whose resistance is to be determined. The two opposing circuits through this wire, R, are composed, the first of the spinning coil and a zero-galvanoscope, and the second of a battery and an absolute galvanometer; these two circuits meeting at the ends of the wire R. The late Mr. Hockin and Prof. Foster find that the best conditions obtain when the resistance of the absolute galvanometer r is equal to R; the resistance of the zero galvanoscope r_2 equal to $\frac{R}{2} + r_3$, and the resistance of the spinning cord, r_3, many times the battery-resistance, which should be so low as to be practically negligible. The E.M.F. of the battery should be double that of the spinning coil. Many other conditions had to be attended to, as explained by Prof. Foster. With this method, and using a thermo-electric battery giving an E.M.F. of 2·2 volts, the coil was spun at about 1800 revolutions per minute; r was 63 ohms, r_2 was 135, r_3 was 50, and R was 73 in one, and of 80 in another experiment. R was made up by coils on a resistance box. The ohm was determined by two trials to be 1·003 and ·999. This general result is so satisfactory that the experiments will be continued with extra precautions. Mr. Glazebrook called attention to the remarkable agreement between the results of Lord Rayleigh's determinations and his own independent ones. Lord Rayleigh's figures are for the unit, 9893, ·9865, ·9868, and Mr. Glazebrook's is ·9866, or the mean of Lord Rayleigh's results. He also announced that the Clarendon Laboratory, Cambridge, would soon be in a position to test and certify any resistance coils sent there.—Mr. Walter Baily then read a paper on the spectra formed by curved diffraction gratings. In a diffraction grating ruled on a portion of a cylinder, if r is the distance of a point from the centre of the grating, and θ the angle which a line to the point makes with the perpendicular from the centre of the grating, c the radius of curvature of the grating, and d an arbitrary constant, a series of curves may be drawn in the plane perpendicular to the lines of the grating having as the general equation

$$r^{-1} \cos^2 \theta = c^{-1} \cos \theta + d^{-1}.$$

If a source of light is placed on a point on one of these, curves the foci of the diffracted light lie on the same curve. The curve consists of two loops, one of which gives the spectra of transmitted and the other those of refracted light. When d is infinite, these curves coincide in a circle, the properties of which have been so used by Prof. Rowland in the construction of his diffraction spectroscope. The paper also describes how the position of the spectra on the curves can be determined for any position of the source of light.

Geological Society, January 24.—J. Gwyn Jeffreys, vice-president, in the chair.—Walter Raleigh Browne, Thomas Charles Maggs, Lieut.-Col. William Alexander Ross, and Cecil Carus Wilson, were elected Fellows of the Society.—The following communications were read:—On *Streptelasma Rœmeri*, sp. nov., from the Wenlock shale, by Prof. P. Martin Duncan, F.R.S., V.P.G.S.—On *Cyathophyllum Fletcheri*, Edw. and H., sp., by Prof. P. Martin Duncan, F.R.S., V.P.G.S.—On the fossil Madreporia of the Great Oolite of the counties of Gloucester and Oxford, by Robert F. Tomes, F.G.S.

Institution of Civil Engineers, January 30.—Mr. Brunlees, president, in the chair.—The paper read was on "Mild Steel for the Fire-boxes of Locomotive Engines in the United States of America," by Mr. John Fernie, M.Inst.C.E.

Sydney

Linnean Society of New South Wales, November 29, 1882.—Dr. James C. Cox, president in the chair.—The following papers were read:—"Description of two new birds of Queensland," by Charles W. De Vis, B.A.—One of these birds—*Prionodura Newtoniana* constitutes a new genus and species of the Family Paradiseidæ. It is described from a unique specimen taken in Tully River scrubs, Rockingham Bay. The other bird described—*Cracticus rufescens* came from the same locality.—"Fungi aliquot Australiæ Orientalis," by the Rev. Carl Kalchbrenner.—The following new species were described *Agaricus megalotheles*, *Agaricus Kirtoni*, *A. peltastes*, and *Scleroderma pileolatum*.—The Rev. J. E. Tenison-Woods, vice-president, read the fifth part of his "Botanical Notes on Queensland."—This paper consisted of a description of the "Brigalow" scrubs, which consist mainly of *Acacia harpophylla* (F.v.M.) instead of *A. excelsa* as usually stated. The brigalow forms thickets of from thirty to eighty feet in height, amongst which a peculiar flora occurs. A list of those collected by the author was given at the end of the paper.—"Contribution to a knowledge of the Fishes of New Guinea" No. 3, by William Macleay, F.L.S., &c.—In this paper Mr. Macleay completes the list of the Fishes sent by Mr. Goldie from Port Moresby, bringing the number up to of species 274. The new species described in the present paper are:—*Platyglossus guttulatus*, *Coris cyanea*, *Pseudoscarus Goldiei*, *Pseudoscarus frontalis*, *Pseudoscarus papuensis*, *Pseudoscarus zonatus*, *Pseudoscarus labiosus*, *Pseudoscarus Moresbyensis*, *Monacanthus nigricans*, *Monacanthus fuliginosus*, *Trygon granulata*, and *Tæniura atra*.—"Notes on the Geology of the Western Coal Fields, No. 2, by Prof. Stephens, M.A.—In this paper Prof. Stephens proceeds to an examination of the Wallerawang, Marangeroo and Capertee conglomerates which leads him directly to the conclusion that the continent oft whose shores the upper marine carboniferous beds were deposited, was a system of high mountain ranges, snow-capped, and under erosion by glaciers which descended to near the level of the sea. It was shown further that all the subsequent formations were of shore or river formation, in plains skirting the mountains, or in valleys penetrating their recesses, and that these were all fresh water deposits, excepting the coal seams themselves, which were subaerial; and that the most recent sedimentary formations in that district was the Hawkesbury Sandstone, also lacustrine in origin, and due like the underlying strata to a continued rise of the lake waters upon the land.—"Note on an Australian species of Phoronis," by William A. Haswell, M.A., B.Sc.—"Note on a curious instance of Symbiosis," by William A. Haswell, M.A., B.Sc.—"Note on the segmental organs of *Aphrodita*," by William A. Haswell, M.A., B.Sc.

Berlin

Physiological Society, December 29, 1882.—Prof. du Bois Reymond in the chair.—Dr. Pohl-Pincus spoke about the effect of weak local stimulations of the heart, and about the effect of vagus-stimulation upon the heart.—Prof. Quincke of Kiel, who was present as a visitor, spoke upon the physiological part of the results of experiments and observations which he had made upon the life-history of the red blood corpuscles. It is a well-known fact that large cells with numerous pigment-granules occur in the spleen and in the marrow of bones. These cells, as the microchemical reaction teaches us, contain a great deal of iron in combination with albumen. The iron-reaction of the spleen and bone-marrow is more pronounced than the number of pigment-cells can explain; and hence Prof. Quincke hypothesizes the presence in both structures of a colourless iron-albumen, which is, on the one hand, the product of the destruction of red corpuscles, and on the other hand forms the material out of which the new red corpuscles are developed. Both these circumstances were verified experimentally; when by frequent transfusions of equal quantities of blood into an animal, the number of the red blood corpuscles was considerably augmented, and, by this means, the destruction of red corpuscles likewise increased, the number of the pigment-cells and the amount of iron-albumen in the spleen and marrow of the bones was also very much increased, and there was present in the capillaries of the liver a consideable quantity of white blood-corpuscles with iron-albumen, which, under normal circumstances are only found in this organ in very small numbers. When, on the other hand, the number of an animal's red blood-corpuscles had been diminished by repeated bleedings, both the number of pigment cells and the amount of iron-albumen in the spleen and marrow was found after a few days to be considerably diminished and reduced to a minimum. While a part of the iron from the disintegrating red blood corpuscles describes a circle forming a reserve for the newly-forming blood-corpuscles, another portion is eliminated from the blood through the urine and bile. In the experiments, in which the destruction of red corpuscles was increased as a consequence of transfusions, it was possible to demonstrate the intermediate stages in the process of the abnormally-large elimination of the iron, as both the liver-cells and the kidney-epithelium gave a quite distinct iron-reaction.—Dr. Schiffer then read two preliminary communications. One of these was upon the poisonous properties of the mammalian urine. When the urine of either carnivorous or herbivorous mammals was injected under the skin of a frog, symptoms of poisoning manifested themselves, to which the frog soon succumbed. Rabbits also exhibited symptoms of poisoning after subcutaneous injection of

evaporated urine, which had been deprived of the poisonous potash-salts. Dr. Schiffer is still engaged in the investigation of the isolation of the poison.—The second communication was upon his experiments with curare. The striking inoperativeness of this violent poison, when introduced into the stomach cannot be due, as has up to the present been almost universally accepted, to the absorbed poison being quickly eliminated by the kidney, because Dr. Schiffer's experiments showed that the elimination of this substance through the urine is complete, although very slow, so that the animal, if it would absorb the poison, would have had to succumb long before. When Dr. Schiffer introduced a very large dose—about 2 grms.—of curare, into a stomach which he had ligatured at the pyloric orifice, the animal died in about twenty-two hours, which was far too late for curare poisoning, and far too soon as a consequence of the ligature of the pylorus. When introduced into the small intestine, the continuity of which was interrupted above and below by a ligature, the curare was very quickly absorbed; when the small intestine was only occluded above, only a very little curare was absorbed, this absorption taking place slowly. The large intestine behaved like the small one. From the rectum out, curare was very quickly absorbed. Outside the body, curare diffused very well through a stomach wall. To sum up, the inoperativeness of curare when introduced into the stomach is as yet unexplained.

PARIS

Academy of Sciences, January 29.—M. Blanchard in the chair.—The death of M. Sedillot, Member in the Section of Medicine and Surgery, was announced.—Note on the observation of the transit of Venus, by M. Janssen. The conditions were very favourable at the fort du Chateau-Neuf, Oran. Special attention was given to the question as to presence of aqueous vapour in the atmosphere of Venus. This was not demonstrated. Afterwards M. Janssen spent a month at Mecheria, a military station on the high desert plateaux, with the same purpose. The air was so dry and clear that, *e.g.*, Jupiter's satellites could be seen with the naked eye. With very perfect spectroscopic apparatus applied under extremely good conditions, he is yet constrained to great reserve as to the presence of aqueous vapour in Venus's atmosphere. He studied mirage, photographed it several times, and finds its causes, in most cases, to be quite different from those commonly supposed.—On the mechanical and physical composition of the sun (continued), by M. Faye. This relates to spots.—Contributions to the history of the reactions between sulphur, carbon, their oxides, and their salts, by M. Berthelot. The results have a bearing on the reactions produced during explosion of powder.—On the morbid phenomena produced in rabbits by introduction of hydrate of chloral into the ear, by M. Vulpian. The most salient phenomenon is impetuous rotation of the animal on its longitudinal axis; which the author attributes to the inflammation produced in the cavities of the internal ear; to this inflammation, along with more or less broncho-pneumonia, the animals often succumbed. The brain and meninges were not affected, as in the experiment of M. Brown-Séquard, who poured chloroform into the ear. Though the disorders of motility are weakened in time, they are found still to persist in some degree, a month after operation.—Observations on the occasion of a Report of M. Leon Colm, on the mortality produced by typhoid fever in the French army, by M. Vulpian. This Report, by a committee of the Academy of Medicine, throws doubt on the value ot M. Glenard's recent statistics (to show the efficacy of cold baths).—Note on the state of natural sciences and on anthropology in Brazil, by M. de Quatrefages. *Inter alia*, Brazil now devotes, on an average, 16 per cent. of her whole revenue to public education; in one of the twenty-one provinces (Goyaz), the proportion reaches 30 per cent. The National Museum in Rio, dating from 1817, has been wholly reorganised by Dom Pedro, and it is of great value. The Emperor is often present at the lectures there. The Museum has its *Archives*, and M. de Quatrefages indicates the contents of the first four volumes sent him; they reveal great scientific activity. The successful Brazilian Anthropological Exhibition held last year is to be followed by one for the entire Continent.—Note on the determination of the phosphoric acid in arable land, by M. de Gasparin. He describes an easy and rapid method. Arrangements were made in connection with a new annual prize of 1000 francs, provided by a widow, Mme. Francœur; it is to be given "to the author of discoveries or works useful to the progress of the mathematical sciences, pure or applied."—On wounds from fire-arms, called seton-wounds, by M. Guérin. These wounds always contain foreign bodies, from crushing of the tissues, and perhaps particles of cloth, &c.; and the conditions are adverse to immediate cicatrisation. The author adopts (with success)—(1) antiseptic washings with continuous currents, (2) pneumatic occlusion; simultaneously, alternately, or successively, as the case may be.—On a class of functions of two independent variables, by M. Picard.—On the algebraic integration of a class of linear equations, by M. Goursat.—On a theorem of M. Tchébychef, by M. Korkine.—Application of a method given by Legendre, by M. Lipschitz.—Observation of a magnetic storm at Cape Horn, by M. Mascart. This was on November 17 and 18 last. The principal perturbation was simultaneous with that at the Parc St. Maur.—Reply to a note by M. Marcel Deprez, by M. Lévy.—M. Deprez presented a translation of the official Report at the Munich Exhibition, on transport of force by dynamo-electric machines.—Reply to M. Lévy, by MM. Mercadier and Vaschy.—New experiment in electrolysis, by M. Semmola. In proof of the law that the quantity of liquid decomposed in a given time is proportional to the quantity of electricity which passes in that time, he uses a voltameter with three platina electrodes inserted equally apart at the bottom. The current coming by one is caused, by a commutator, to pass either by one of the others or by both.—Researches on the passages of alcoholic liquors through porous bodies (second note), by M. Gal. He investigates the influence of temperature, and nature of membrane, and the case in which the membrane is exclusively in contact with the liquid or with its vapour. An alcoholic liquid in contact with a membrane tends to diminish in degree, instead of concentrating, as Sœmmering affirmed, and as is everywhere taught; and it is the same with its vapour.—On the vapour of carbamide, by M. Isambert.—On sulphite of manganese, by M. Gorgeu.—On new ammonio-cobaltic combinations, by M. Maquenne.—On the crystalline form, specific heat, and atomicity of thorium, by M. Nilson. The crystals form a regular combination between the octahedron and the tetrahedron: the specific heat is 0·02757; the substance is quadrivalent.—On the mutual displacements of bases, &c. (continued), by M. Menschutkine.—Importance of zoological characters furnished by the upper lip in the *Syrphides* (Diptera), by M. Gazagnaire.—On the effects of respiration of air charged with petroleum vapour, by M. Poincaré. Dogs, rabbits, and guinea-pigs were experimented with. Respiration was increased in frequency and amplitude, heart-beats were retarded, (the shock was intensified); there was itchiness, sleepiness, and inappetence. Guinea-pigs alone succumbed, after one to two years.

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